



RATING SYSTEMS for Electron Devices

Three Rating Systems are in use by the Electron-Device Industry. The oldest is known as the Absolute-Maximum System, the next as the Design-Center System, and the latest and newest is the Design-Maximum System. Definitions of these systems have been formulated by the Joint Electron Tube Engineering Council (JETEC)—now identified as the Joint Electron Device Engineering Council (JEDEC)—and standardized by National Electrical Manufacturers Association (NEMA) and Electronic Industries Association (EIA) as follows:

Absolute-Maximum Rating System

Absolute-Maximum ratings are limiting values of operating and environmental conditions applicable to any electron device of a specified type as defined by its published data, and should not be exceeded under the worst probable conditions.

The device manufacturer chooses these values to provide acceptable serviceability of the device, taking no responsibility for equipment variations, environment variations, and the effects of changes in operating conditions due to variations in device characteristics.

The equipment manufacturer should design so that initially and throughout life no Absolute-Maximum value for the intended service is exceeded with any device under the worst probable operating conditions with respect to supply-voltage variation, equipment-component variation, equipment-control adjustment, load variation, signal variation, environmental conditions, and variations in device characteristics.

Design-Center Rating System

Design-Center ratings are limiting values of operating and environmental conditions applicable to a bogey electron device of a specified type as defined by its published data, and should not be exceeded under normal conditions.

The device manufacturer chooses these values to provide acceptable serviceability of the device in average applications, taking responsibility for normal changes in operating conditions due to rated supply-voltage variation*, equipment-component variation, equipment-control adjustment, load variation, signal variation, environmental conditions, and variations in device characteristics.

The equipment manufacturer should design so that initially no Design-Center value for the intended service is exceeded with a bogey device in equipment operating at the stated normal supply voltage*.

* For an ac power source, 117 volts plus or minus 10 per cent is accepted USA practice.



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Design-Maximum Rating System

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The device manufacturer chooses these values to provide acceptable serviceability of the device, taking responsibility for the effects of changes in operating conditions due to variations in device characteristics.

The equipment manufacturer should design so that initially and throughout life no Design-Maximum value for the intended service is exceeded with a bogey device under the worst probable operating conditions with respect to supply-voltage variation, equipment-component variation, equipment-control adjustment, load variation, signal variation, and environmental conditions.

Differences Between Systems

The significant differences between the three Rating Systems can be summarized as follows:

Absolute-Maximum System:

$$\text{Ratings} = \left[\begin{array}{c} \text{Maximum capa-} \\ \text{bilities of} \\ \text{any electron} \\ \text{device of the} \\ \text{type rated} \end{array} \right]$$

Design-Center System:

$$\text{Ratings} = \left[\begin{array}{c} \text{Maximum capa-} \\ \text{bilities of} \\ \text{any electron} \\ \text{device of the} \\ \text{type rated} \end{array} \right] - \left[\begin{array}{c} \text{Allow-} \\ \text{ance for} \\ \text{electron-} \\ \text{device} \\ \text{variations} \end{array} \right] - \left[\begin{array}{c} \text{Allowance} \\ \text{for} \\ \text{component} \\ \text{and supply} \\ \text{variations} \end{array} \right]$$

Design-Maximum System:

$$\text{Ratings} = \left[\begin{array}{c} \text{Maximum capa-} \\ \text{bilities of} \\ \text{any electron} \\ \text{device of the} \\ \text{type rated} \end{array} \right] - \left[\begin{array}{c} \text{Allow-} \\ \text{ance for} \\ \text{electron-} \\ \text{device} \\ \text{variations} \end{array} \right]$$